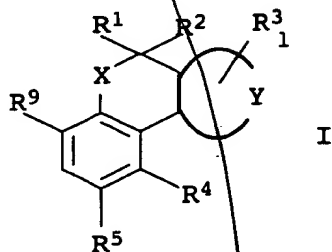


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We claim:

1. A tricyclic benzoylpyrazole derivative of the formula I



where:

15 X is oxygen, sulfur, S=O, S(=O)₂, CR⁶R⁷, NR⁸ or a bond;

20 Y together with the two carbons to which it is attached forms a saturated, partially saturated or unsaturated 5- or 6-membered heterocycle which contains one to three identical or different heteroatoms selected from the following group: oxygen, sulfur and nitrogen;

25 R¹, R², R⁶, R⁷ are hydrogen, C₁-C₆-alkyl, C₁-C₆-haloalkyl, C₁-C₆-alkoxy or C₁-C₆-haloalkoxy;

30 R³ is halogen, C₁-C₆-alkyl, C₁-C₆-haloalkyl, C₁-C₆-alkoxy or C₁-C₆-haloalkoxy;

35 R⁴ is hydrogen, nitro, halogen, cyano, C₁-C₆-alkyl, C₁-C₆-haloalkyl, C₁-C₆-alkoxy, C₁-C₆-haloalkoxy, C₁-C₆-alkylthio, C₁-C₆-haloalkylthio, C₁-C₆-alkylsulfinyl, C₁-C₆-haloalkylsulfinyl, C₁-C₆-alkylsulfonyl, C₁-C₆-haloalkylsulfonyl, aminosulfonyl, N-(C₁-C₆-alkyl)aminosulfonyl, N,N-di(C₁-C₆-alkyl)aminosulfonyl, N-(C₁-C₆-alkylsulfonyl)amino, N-(C₁-C₆-haloalkylsulfonyl)amino, N-(C₁-C₆-alkyl)-N-(C₁-C₆-alkylsulfonyl)amino or N-(C₁-C₆-alkyl)-N-(C₁-C₆-haloalkylsulfonyl)amino;

45 R⁵ is hydrogen, C₁-C₆-alkyl or halogen;

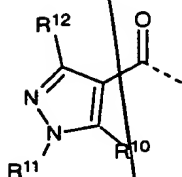
R⁸ is hydrogen, C₁-C₆-alkyl, C₁-C₆-haloalkyl, C₁-C₆-alkylcarbonyl, formyl, C₁-C₆-alkoxycarbonyl,

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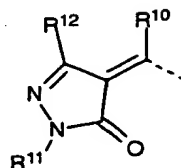
C_1 - C_6 -haloalkoxycarbonyl, C_1 - C_6 -alkylsulfonyl or C_1 - C_6 -haloalkylsulfonyl;

1 is 0, 1 or 2;

R^9 is a radical IIa or IIb



IIa



IIb

where

R^{10} is hydroxyl, mercapto, halogen, OR^{13} , SR^{13} , SO_2R^{14} , $NR^{15}R^{16}$ or N-bonded heterocyclyl, where the heterocyclyl radical may be partially or fully halogenated and/or may carry one to three of the following radicals:

nitro, cyano, C_1 - C_4 -alkyl, C_1 - C_4 -haloalkyl, C_1 - C_4 -alkoxy or C_1 - C_4 -haloalkoxy;

R^{11} is hydrogen, C_1 - C_6 -alkyl, C_1 - C_6 -haloalkyl, C_3 - C_6 -cycloalkyl, hydroxyl, C_1 - C_6 -alkoxy or C_1 - C_6 -haloalkoxy;

R^{12} is hydrogen, halogen, C_1 - C_6 -alkyl, C_1 - C_6 -haloalkyl, hydroxyl, C_1 - C_6 -alkoxy, C_1 - C_6 -haloalkoxy, C_1 - C_6 -alkylthio or C_1 - C_6 -haloalkylthio;

R^{13} is C_1 - C_6 -alkyl, C_3 - C_6 -alkenyl, C_3 - C_6 -haloalkenyl, C_3 - C_6 -alkynyl, C_3 - C_6 -haloalkynyl, C_3 - C_6 -cycloalkyl, C_1 - C_{20} -alkylcarbonyl, C_2 - C_{20} -alkenylcarbonyl, C_2 - C_6 -alkynylcarbonyl, C_3 - C_6 -cycloalkylcarbonyl, C_1 - C_6 -alkoxycarbonyl, C_3 - C_6 -alkenyloxycarbonyl, C_3 - C_6 -alkynyloxycarbonyl, C_1 - C_6 -alkylthiocarbonyl, C_1 - C_6 -alkylaminocarbonyl, C_3 - C_6 -alkenylaminocarbonyl, C_3 - C_6 -alkynylaminocarbonyl, N,N-di(C_1 - C_6 -alkyl)aminocarbonyl, N-(C_3 - C_6 -alkenyl)-N-(C_1 - C_6 -alkyl)aminocarbonyl, N-(C_3 - C_6 -alkynyl)-N-(C_1 - C_6 -alkyl)aminocarbonyl, N-(C_1 - C_6 -alkoxy)-N-(C_1 - C_6 -alkyl)aminocarbonyl, N-(C_3 - C_6 -alkenyl)-N-(C_1 - C_6 -alkoxy)aminocarbonyl,

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N-(C₃-C₆-alkynyl)-N-(C₁-C₆-alkoxy)aminocarbonyl,
di(C₁-C₆-alkyl)aminothiocarbonyl,
C₁-C₆-alkylcarbonyl-C₁-C₆-alkyl,
C₁-C₆-alkoxyimino-C₁-C₆-alkyl,

10

N-(C₁-C₆-alkylamino)imino-C₁-C₆-alkyl or
N,N-di(C₁-C₆-alkylamino)imino-C₁-C₆-alkyl, where
the abovementioned alkyl, cycloalkyl and alkoxy
radicals may be partially or fully halogenated
and/or may carry one to three of the following
groups:

15

cyano, C₁-C₄-alkoxy, C₁-C₄-alkylthio,
di(C₁-C₄-alkyl)amino, C₁-C₄-alkylcarbonyl,
C₁-C₄-alkoxycarbonyl,
C₁-C₄-alkoxy-C₁-C₄-alkoxycarbonyl,
di(C₁-C₄-alkyl)amino-C₁-C₄-alkoxycarbonyl,
hydroxycarbonyl, C₁-C₄-alkylaminocarbonyl,
di(C₁-C₄-alkyl)aminocarbonyl, aminocarbonyl,
C₁-C₄-alkylcarbonyloxy or C₃-C₆-cycloalkyl;

20

is phenyl, heterocyclyl, phenyl-C₁-C₆-alkyl,
heterocyclyl-C₁-C₆-alkyl,
phenylcarbonyl-C₁-C₆-alkyl,
heterocyclylcarbonyl-C₁-C₆-alkyl, phenylcarbonyl,
heterocyclylcarbonyl, phenoxycarbonyl,
phenyloxythiocarbonyl, heterocycliloxy carbonyl,
heterocycliloxythiocarbonyl, phenylaminocarbonyl,
N-(C₁-C₆-alkyl)-N-(phenyl)aminocarbonyl,
heterocyclylaminocarbonyl,

25

30

N-(C₁-C₆-alkyl)-N-(heterocyclyl)aminocarbonyl,
phenyl-C₂-C₆-alkenylcarbonyl or
heterocyclyl-C₂-C₆-alkenylcarbonyl, where the
phenyl and the heterocyclyl radical of the 18
lastmentioned substituents may be partially or
fully halogenated and/or may carry one to three of
the following radicals:

35

nitro, cyano, C₁-C₄-alkyl, C₁-C₄-haloalkyl,
C₁-C₄-alkoxy, C₁-C₄-haloalkoxy, heterocyclyl or
N-bonded heterocyclyl, where the two lastmentioned
substituents for their part may be partially or
fully halogenated and/or may carry one to three of
the following radicals:
nitro, cyano, C₁-C₄-alkyl, C₁-C₄-haloalkyl,
C₁-C₄-alkoxy or C₁-C₄-haloalkoxy;

40

45 R¹⁴

is C₁-C₆-alkyl, C₃-C₆-alkenyl, C₃-C₆-haloalkenyl,
C₃-C₆-alkynyl, C₃-C₆-haloalkynyl, C₃-C₆-cycloalkyl,
C₁-C₆-alkoxy, di(C₁-C₆-alkyl)amino or

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di(C₁-C₆-haloalkyl)amino, where the abovementioned alkyl, cycloalkyl and alkoxy radicals may be partially or fully halogenated and/or may carry one to three of the following groups:

10

cyano, C₁-C₄-alkoxy, C₁-C₄-alkylthio, di(C₁-C₄-alkyl)amino, C₁-C₄-alkylcarbonyl, C₁-C₄-alkoxycarbonyl, C₁-C₄-alkoxy-C₁-C₄-alkoxycarbonyl, di(C₁-C₄-alkyl)amino-C₁-C₄-alkoxycarbonyl, hydroxycarbonyl, C₁-C₄-alkylaminocarbonyl, di(C₁-C₄-alkyl)aminocarbonyl, aminocarbonyl, C₁-C₄-alkylcarbonyloxy or C₃-C₆-cycloalkyl;

15

is phenyl, heterocyclyl, phenyl-C₁-C₆-alkyl, heterocyclyl-C₁-C₆-alkyl, phenoxy, heterocycliloxy, where the phenyl and the heterocyclyl radical of the lastmentioned substituents may be partially or fully halogenated and/or may carry one to three of the following radicals:

20

nitro, cyano, C₁-C₄-alkyl, C₁-C₄-haloalkyl, C₁-C₄-alkoxy or C₁-C₄-haloalkoxy;

R¹⁵

25

is C₁-C₆-alkyl, C₃-C₆-alkenyl, C₃-C₆-haloalkenyl, C₃-C₆-alkynyl, C₃-C₆-haloalkynyl, C₃-C₆-cycloalkyl, C₁-C₆-alkoxy, C₃-C₆-alkenyloxy, C₃-C₆-alkynyloxy, di(C₁-C₆-alkyl)amino or C₁-C₆-alkylcarbonylamino, where the abovementioned alkyl, cycloalkyl and alkoxy radicals may be partially or fully halogenated and/or may carry one to three radicals of the following group:

30

cyano, C₁-C₄-alkoxy, C₁-C₄-alkylthio, di(C₁-C₄-alkyl)amino, C₁-C₄-alkylcarbonyl, C₁-C₄-alkoxycarbonyl, C₁-C₄-alkoxy-C₁-C₄-alkoxycarbonyl, di(C₁-C₄-alkyl)amino-C₁-C₄-alkoxycarbonyl, hydroxycarbonyl, C₁-C₄-alkylaminocarbonyl, di(C₁-C₄-alkyl)aminocarbonyl, aminocarbonyl, C₁-C₄-alkylcarbonyloxy or C₃-C₆-cycloalkyl;

35

40

is phenyl, heterocyclyl, phenyl-C₁-C₆-alkyl or heterocyclyl-C₁-C₆-alkyl, where the phenyl or heterocyclyl radical of the four lastmentioned substituents may be partially or fully halogenated and/or may carry one to three of the following radicals:

45

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nitro, cyano, C₁-C₄-alkyl, C₁-C₄-haloalkyl,
C₁-C₄-alkoxy or C₁-C₄-haloalkoxy;

R¹⁶ is C₁-C₆-alkyl, C₃-C₆-alkenyl, C₃-C₆-alkynyl or
C₁-C₆-alkylcarbonyl;

and their agriculturally useful salts.

2. A tricyclic benzoylpyrazole derivative of the formula I as
claimed in claim 1 where R⁹ is IIa.

3. A tricyclic benzoylpyrazole derivative of the formula I as
claimed in claim 1 or 2 where X is oxygen, sulfur or a bond.

4. A tricyclic benzoylpyrazole derivative of the formula I as
claimed in any of claims 1 to 3 where

Y together with the two carbons to which it is
attached forms a heterocycle selected from the
following group: dihydropyrazolediyl,
dihydroisoxazolediyl, pyrazolediyl, isoxazolediyl
or pyrimidinediyl.

5. A tricyclic benzoylpyrazole derivative of the formula I as
claimed in any of claims 1 to 4 where

R¹, R² are hydrogen;

R³ is C₁-C₆-alkyl;

R⁴ is nitro, halogen, C₁-C₆-alkyl, C₁-C₆-haloalkyl,
C₁-C₆-alkoxy, C₁-C₆-alkylthio or
C₁-C₆-alkylsulfonyl;

R⁵ is hydrogen;

l is 0 or 1.

6. A tricyclic benzoylpyrazole derivative of the formula I as
claimed in any of claims 1 to 5 where

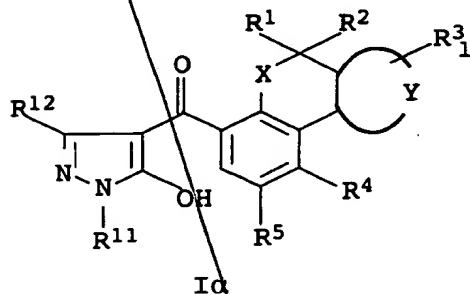
R¹⁰ is hydroxyl;

R¹¹ is C₁-C₆-alkyl or C₃-C₆-cycloalkyl;

R¹² is hydrogen or C₁-C₆-alkyl.

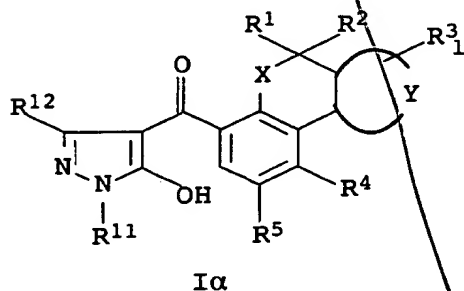
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7. A process for preparing compounds of the formula I where R^{10} = halogen as claimed in claim 1, which comprises reacting a tricyclic benzoylpyrazole derivative of the formula Ia (= I where R^{10} = hydroxyl),

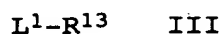


where the variables R^1 to R^5 , R^{11} and R^{12} , X, Y and l are as defined in claim 1, with a halogenating agent.

8. A process for preparing compounds of the formula I where R^{10} = OR^{13} as claimed in claim 1, which comprises reacting a tricyclic benzoylpyrazole derivative of the formula Ia (= I where R^{10} = hydroxyl),



where the variables R^1 to R^5 , R^{11} and R^{12} , X, Y and l are as defined in claim 1, with a compound of the formula III

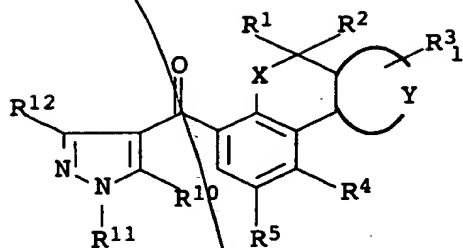


where the variable R^{13} is as defined in claim 1 and L^1 is a nucleophilically replaceable leaving group.

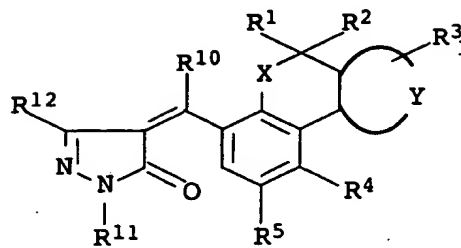
9. A process for preparing compounds of the formula I where R^{10} = OR^{13} , SR^{13} , $NR^{15}R^{16}$ or N-bonded heterocyclyl as claimed in claim 1, which comprises reacting a compound of the formula Ib (= I where R^{10} = halogen),

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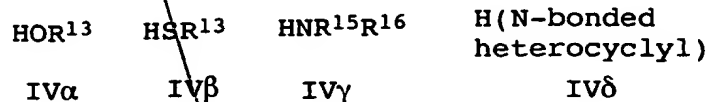
Iβ



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where the variables R^1 to R^5 , R^{11} and R^{12} , X , Y and l are as defined in claim 1, with a compound of the formula $IV\alpha$, $IV\beta$, $IV\gamma$ or $IV\delta$

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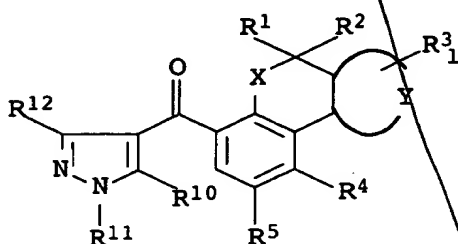
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where the variables R^{13} to R^{16} are as defined in claim 1, if appropriate in the presence of a base.

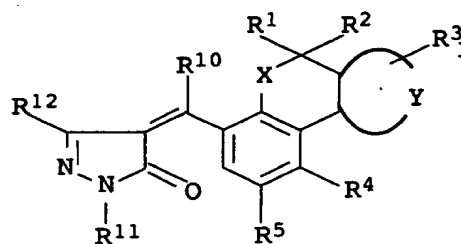
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10. A process for preparing compounds of the formula I where $R^{10} = SO_2R^{14}$ as claimed in claim 1, which comprises reacting a compound of the formula $I\gamma$ ($= I$ where $R^{10} = SR^{14}$),

30



Iγ



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where the variables R^1 to R^5 , R^{11} and R^{12} , X , Y and l are as defined in claim 1, with an oxidizing agent.

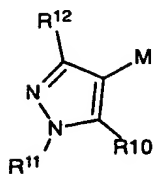
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11. A process for preparing compounds of the formula I where $R^9 = IIa$ as claimed in claim 1, which comprises reacting a metalated pyrazole derivative of the formula V where M is a metal and R^{10} to R^{12} are as defined in claim 1, except for $R^{10} = \text{hydroxyl}$ and mercapto, with a tricyclic benzoic acid derivative of the formula VIa where R^1 to R^5 , X , Y and l are as defined in claim 1 and L^2 is a nucleophilically replaceable leaving group.

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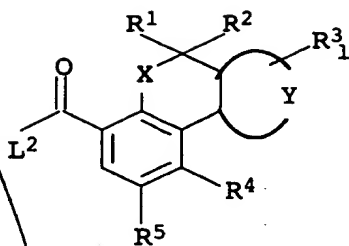
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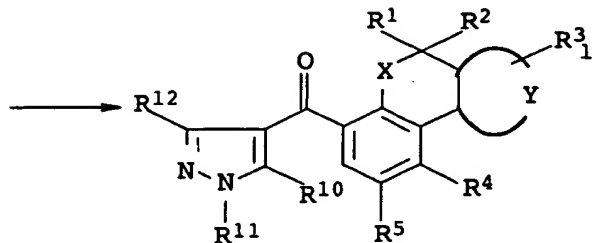


V

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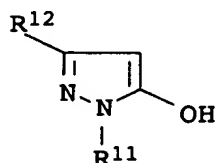


VIα

Ia (where $R^{10} \neq OH, SH$)

- 10 12. A process for preparing tricyclic benzoylpyrazole derivatives of the formula Ia (= I where R^{10} = hydroxyl) as claimed in claim 1, which comprises acylating a pyrazole of the formula VII in which the variables R^{11} and R^{12} are as defined in claim 1

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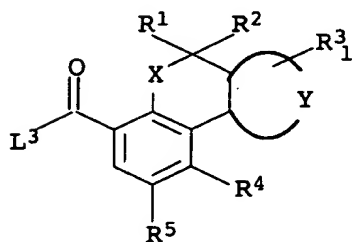


VII

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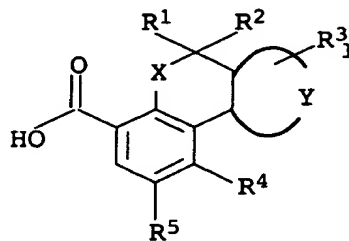
with an activated tricyclic benzoic acid of the formula VIβ or with a tricyclic benzoic acid VIγ,

25



VIβ

30



VIγ

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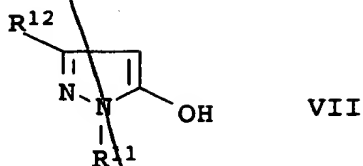
where the variables R^1 to R^5 , X, Y and l are as defined in claim 1 and L^3 is a nucleophilically replaceable leaving group, and rearranging the acylation product, if appropriate in the presence of a catalyst.

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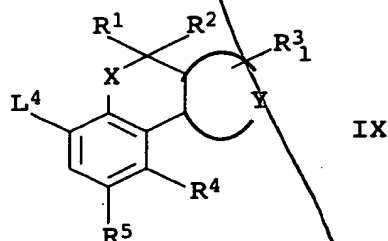
13. A process for preparing tricyclic benzoylpyrazole derivatives of the formula Ia (\equiv I where R^{10} = hydroxyl) as claimed in claim 1, which comprises reacting a pyrazole of the formula VII in which the variables R^{11} and R^{12} are as defined in claim 1, or an alkali metal salt thereof,

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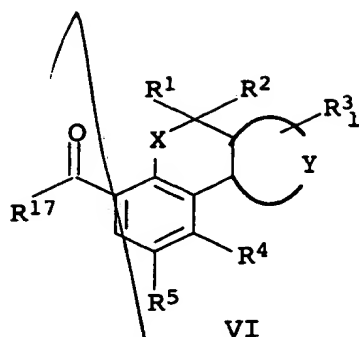
10 with a tricyclic benzene derivative of the formula IX where L⁴ is a leaving group and the variables X, Y, R¹ to R⁵ and 1 are as defined in claim 1



in the presence of carbon monoxide, a catalyst and a base.

- 20
14. A composition, comprising a herbicidally effective amount of at least one tricyclic benzoylpyrazole derivative of the formula I or an agriculturally useful salt of I as claimed in claims 1 to 6 and auxiliaries which are customary for formulating crop protection agents.
- 25
15. A process for preparing compositions as claimed in claim 14, which comprises mixing a herbicidally effective amount of at least one tricyclic benzoylpyrazole derivative of the formula I or an agriculturally useful salt of I as claimed in claims 1 to 6 and auxiliaries which are customary for formulating crop protection agents.
- 30
16. A method for controlling undesirable vegetation, which comprises allowing a herbicidally effective amount of at least one tricyclic benzoylpyrazole derivative of the formula I or an agriculturally useful salt of I as claimed in claims 1 to 6 to act on plants, their habitat and/or on seed.
- 35
17. The use of tricyclic benzoylpyrazole derivatives of the formula I or their agriculturally useful salts as claimed in claims 1 to 6 as herbicides.
- 40
18. A tricyclic benzoic acid derivative of the formula VI
- 45

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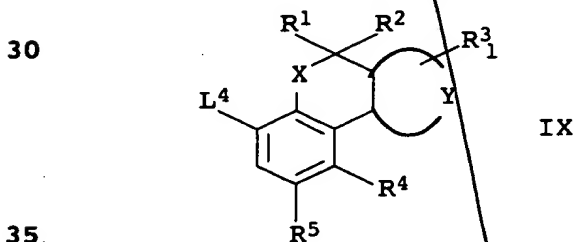


10 in which the variables X, Y, R¹ to R³ and R⁵ and l are as defined in claim 1 and

15 R⁴ is nitro, halogen, cyano, C₁-C₆-alkyl, C₁-C₆-haloalkyl, C₁-C₆-alkoxy, C₁-C₆-haloalkoxy, C₁-C₆-alkylthio, C₁-C₆-haloalkylthio, C₁-C₆-alkylsulfinyl, C₁-C₆-haloalkylsulfinyl, C₁-C₆-alkylsulfonyl, C₁-C₆-haloalkylsulfonyl, aminosulfonyl, N-(C₁-C₆-alkyl)aminosulfonyl, N,N-di(C₁-C₆-alkyl)aminosulfonyl, N-(C₁-C₆-alkylsulfonyl)amino, N-(C₁-C₆-haloalkylsulfonyl)amino, N-(C₁-C₆-alkyl)-N-(C₁-C₆-alkylsulfonyl)amino or N-(C₁-C₆-alkyl)-N-(C₁-C₆-haloalkylsulfonyl)amino;

25 R¹⁷ is hydroxyl or a radical which can be removed by hydrolysis.

19. A tricyclic benzene derivative of the formula IX



in which the variables X, Y, R¹ to R³ and l are as defined in claim 1 and

40 R⁴ is nitro, halogen, cyano, C₁-C₆-alkyl, C₁-C₆-haloalkyl, C₁-C₆-alkylthio, C₁-C₆-haloalkylthio, C₁-C₆-alkylsulfinyl, C₁-C₆-haloalkylsulfinyl, C₁-C₆-alkylsulfonyl, C₁-C₆-haloalkylsulfonyl, aminosulfonyl, N-(C₁-C₆-alkyl)aminosulfonyl, N,N-di(C₁-C₆-alkyl)aminosulfonyl, N-(C₁-C₆-alkylsulfonyl)amino,

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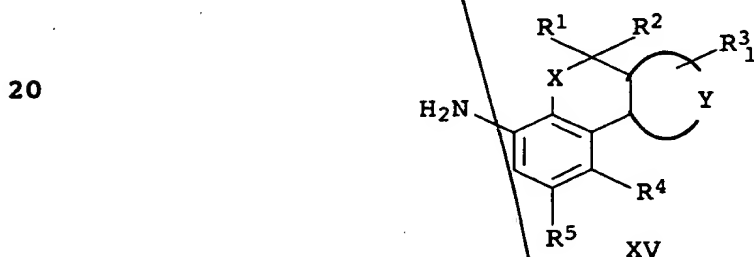
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$N-(C_1-C_6\text{-haloalkylsulfonyl})\text{amino}$,
 $N-(C_1-C_6\text{-alkyl})-N-(C_1-C_6\text{-alkylsulfonyl})\text{amino}$ or
 $N-(C_1-C_6\text{-alkyl})-N-(C_1-C_6\text{-haloalkylsulfonyl})\text{amino}$;

5 R^5 is hydrogen or $C_1-C_6\text{-alkyl}$;

10 L^4 is halogen, $C_1-C_6\text{-alkylsulfonyloxy}$,
 $C_1-C_6\text{-haloalkylsulfonyloxy}$ or phenylsulfonyloxy,
 where the phenyl ring of the lastmentioned radical
 may be unsubstituted or partially or fully
 halogenated and/or may carry one to three of the
 following radicals:
 nitro, cyano, $C_1-C_4\text{-alkyl}$, $C_1-C_4\text{-haloalkyl}$,
 $C_1-C_4\text{-alkoxy}$ or $C_1-C_4\text{-haloalkoxy}$.

15 20. An aniline of the formula XV and a nitrile of the formula XVI



25 in which the variables X, Y, R^1 to R^3 and R^5 and 1 are in each case as defined in claim 1 and

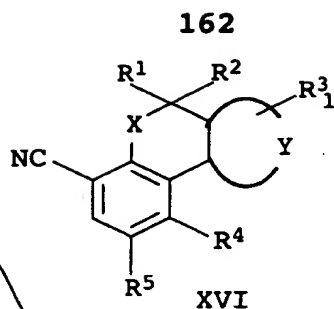
30 R^4 is nitro, halogen, cyano, $C_1-C_6\text{-haloalkyl}$,
 $C_1-C_6\text{-alkoxy}$, $C_1-C_6\text{-haloalkoxy}$, $C_1-C_6\text{-alkylthio}$,
 $C_1-C_6\text{-haloalkylthio}$, $C_1-C_6\text{-alkylsulfinyl}$,
 $C_1-C_6\text{-haloalkylsulfinyl}$, $C_1-C_6\text{-alkylsulfonyl}$,
 $C_1-C_6\text{-haloalkylsulfonyl}$, aminosulfonyl,
 35 $N-(C_1-C_6\text{-alkyl})\text{aminosulfonyl}$,
 $N,N\text{-di}(C_1-C_6\text{-alkyl})\text{aminosulfonyl}$,
 $N-(C_1-C_6\text{-alkylsulfonyl})\text{amino}$,
 $N-(C_1-C_6\text{-haloalkylsulfonyl})\text{amino}$,
 $N-(C_1-C_6\text{-alkyl})-N-(C_1-C_6\text{-alkylsulfonyl})\text{amino}$ or
 $N-(C_1-C_6\text{-alkyl})-N-(C_1-C_6\text{-haloalkylsulfonyl})\text{amino}$.

40 21. A nitrile of the formula XVI

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in which the variables X, Y, R¹ to R³ and l are in each case as defined in claim 1 and

15

R⁴ is nitro, halogen, cyano, C₁-C₆-haloalkyl, C₁-C₆-alkylthio, C₁-C₆-haloalkylthio, C₁-C₆-alkylsulfinyl, C₁-C₆-haloalkylsulfinyl, C₁-C₆-alkylsulfonyl, C₁-C₆-haloalkylsulfonyl, aminosulfonyl, N-(C₁-C₆-alkyl)aminosulfonyl, N,N-di-(C₁-C₆-alkyl)aminosulfonyl, N-(C₁-C₆-alkylsulfonyl)amino, N-(C₁-C₆-haloalkylsulfonyl)amino, N-(C₁-C₆-alkyl)-N-(C₁-C₆-alkylsulfonyl)amino or N-(C₁-C₆-alkyl)-N-(C₁-C₆-haloalkylsulfonyl)amino;

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R⁵ is hydrogen or C₁-C₆-alkyl.

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Add
B3

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